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Common Sheep Parasites



COOPERATIVE EXTENSION SERVICE
SOUTH DAKOTA STATE UNIVERSITY
U. S. DEPARTMENT OF AGRICULTURE

Common Sheep Parasites

Herley L. Miller, Extension sheep specialist

Internal parasite problems are found in sheep producing areas throughout the United States. Parasites causing economic loss affect all classes and ages of sheep; damage, however, is normally greatest to lambs, yearlings and extremely old sheep.

Proper nutrition is of extreme importance in the control of internal parasites. Sheep in good condition and receiving adequate feed are often able to establish some resistance to internal parasites. Poorly fed sheep are unable to cope with parasitism, and death losses can be great.

Each parasite class includes several species. Those species important to South Dakota will be considered here.

Twisted Stomach Worms, Roundworms (Common stomach worm, *Haemonchus contortus*)

Roundworm parasitism is one of the major disease complexes of sheep, and the twisted stomach worm is the most destructive South Dakota sheep parasite. Lambs are the most seriously affected. Roundworms of economic importance in sheep are almost all extremely small, hair-like worms $\frac{3}{4}$ to $1\frac{1}{2}$ inches long. Roundworms are usually found in the fourth stomach, or abomasum, though some may be in the first part of the intestine. Live females are marked with a spiral striping, resembling a barber pole. These parasites cause particular trouble in sheep on wet pasture.

Life Cycle and Habits. The life history and habits of the stomach worm have been well established (figure 1). The adult females, normally living in the abomasum, lay enormous numbers of microscopic eggs. These pass out with the feces. Under favorable temperatures and moisture conditions, eggs hatch into larvae

within a few hours. Larvae then molt twice and develop into the infective stage. This occurs within 2 weeks after passing from the host. When sufficient moisture is present, the young larva crawls up on a grass blade, resting with evaporation and moving upward when the grass blade is again moist. At this stage it is greatly resistant to changes in temperature and moisture.

While clinging to a blade of grass the larva may be swallowed by a grazing animal. It then travels to the fourth stomach, develops into the adult stage, and lays eggs, thus starting another cycle. Each female can lay about 6,000 eggs daily.

The entire life cycle of the stomach worm may be completed in 21 days under favorable conditions. A heavily infested sheep may pass as many as 3 million worm eggs in a period of 24 hours.

Symptoms. Sheep infested with stomach worms first become unthrifty and listless and later thin and weak. Membranes of the eyes, nose, and mouth become pale from loss of blood. Diarrhea may be present. The wool on heavily infested animals may eventually become loose and easy to pull out. A watery swelling under the lower jaw sometimes occurs, referred to as "bottle jaw" or "poverty jaw." Swelling along the abdomen will also develop.

No symptom or group of symptoms is a positive clue to the presence of stomach worms. Identical symptoms may be exhibited in other cases of infestation by some other parasites. A correct diagnosis can only be made by post-mortem examination of the intestinal tract and by microscopic examination of the feces and identification of the eggs. In making post-mortem examinations, sacrifice a weak animal or obtain an animal immediately after death; otherwise the worms may disintegrate and be difficult to find.

Tapeworm

Three species of tapeworm are common. These are the Broad tapeworm, *Moniezia expansa*, *M. benedini*, and the Fringed tapeworm, *Thysanosoma actinoides*.

Sheep may harbor several different species of tapeworms in both adult and larvae stages. The common tapeworms *Moniezia expansa* and *M. benedini* are long, flat ribbon-like worms which sometimes reach a length of several yards and breadth of $\frac{3}{4}$ inch. Specimens 20 feet long have been found in lambs. The fringed tapeworm, *Thysanosoma actinoides*, derives its common name from the characteristic fringe which appears on the posterior of each segment. All species of tapeworms are commonly found in the small intestines of the host animals. In addition, the fringed tapeworm may occur in the cystic duct, gall bladder, and in the ducts of the liver and pancreas.

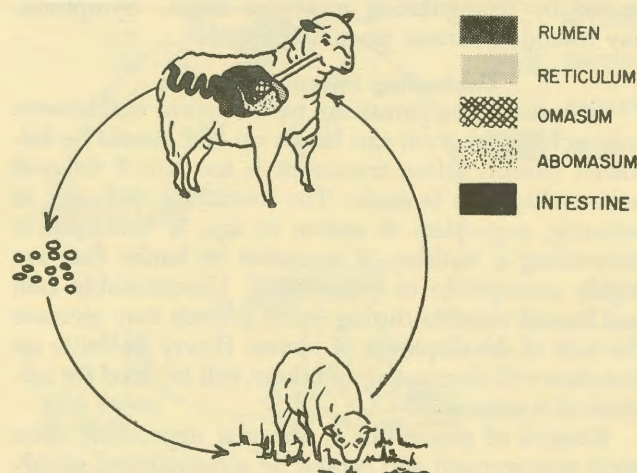


Fig. 1. Life cycle of the twisted stomach worm.

Sheep in all parts of South Dakota may become infested with one or more species of tapeworms. *Moniezia expansa* (broad tapeworm) occurs throughout the state. The fringed tapeworm appears to be more prevalent, however, in the range bands in western South Dakota, but it has occasionally been found in eastern sections.

Life History and Habits. The life history of the fringed tapeworm is unknown, but it is thought to require an intermediate invertebrate host through which it must pass before it can infest sheep (figure 2). The life histories of the broad tapeworm and *M. benedini* appear to be about as follows: The microscopic eggs and segments containing eggs pass out with the feces. After infesting suitable intermediate hosts, (oribatid mites and beetle mites) the eggs develop into an intermediate larvae stage. Sheep become infested by swallowing such larvae.

The larvae travel to the small intestine of the host, where they develop into adult worms. With reproduction, a new life cycle is started.

Symptoms. Diarrhea and retarded growth or loss of condition appear to be chief symptoms of tapeworm infestation. Infected sheep usually have normal appetites. The fringed tapeworm may cause death of the host through blocking the cystic duct, gall bladder, and the ducts of the liver and pancreas. A post-mortem should be considered.

Liver Fluke

The common liver fluke is a parasite worm that infects the liver of a variety of animal species. It must develop in a freshwater snail before it gets into the animal's body.

Sheep are extremely susceptible to fluke infection. The parasite causes heavy bleeding in the liver, where it damages or destroys tissues.

Life Cycle and Habits. The fluke is passed to the environment in fecal excrement. A free-living stage emerges from the egg. It requires adequate water for existence and is able to swim (figure 3). An appropriate species of snail (intermediate host) is necessary for further development, which requires at least 30 days. When moisture conditions are again adequate, these forms leave the snail and encyst on vegetation on the water's surface. This is the infective stage and must be ingested by the definitive host (sheep). The young fluke is released from the cyst, penetrates the wall of the small intestine and, after spending 4-6 days in the abdominal cavity, penetrates the liver. It migrates through the liver, feeding on the liver tissue. After 5-6 weeks it enters the bile ducts where it matures and deposits eggs.

Symptoms. Heavily infected sheep may die without noticeable symptoms. Less severely affected sheep may appear dull, weak, and anemic, and they usually tire easily. Affected sheep are usually susceptible to "black disease." Livers from sheep infected with liver



flukes are not suitable for human consumption and are a significant cause of liver condemnation.

Lungworms

Thread lungworm, *Dictyocaulus filaria*, is the most common lungworm of sheep. The thread lungworm occurs in the bronchi and trachea of sheep. Individuals may measure from 1-3 inches in length and are thread-like in appearance. They are whitish in color and may be present in small numbers (1 or 2) to large numbers (several hundred) in individual hosts.

Life Cycle and Habits. Eggs which contain the first stage larvae are deposited in air passages of the host. The eggs move up the trachea and are then swallowed. The eggs hatch in the intestine (figure 4) and the first stage larva is passed in the feces. As a result of first and second moults, the larva develops and is ingested by sheep. The larva penetrates the small intestine and enters the lymphatic system. The third moult occurs in the mesenteric lymph nodes. The larva passes via the lymph vessels to the heart and to the pulmonary vessels, then leaves the pulmonary system and migrates to the alveoli, bronchi and trachea.

Symptoms. Infected sheep may exhibit rapid breathing, coughing, accelerated heart beat, listlessness, loss of appetite and condition. Death may be caused by strangulation in severe cases. Symptoms may resemble chronic pneumonia.

Controlling Internal Parasites

In areas where parasitism problems are well known, a drenching program can be set up and should be followed closely. Often treatment is too late if delayed until a diagnosis is made. The drenching of lambs at weaning, regardless of season or age, is beneficial in preventing a buildup of parasites in lambs that are highly susceptible to parasitism. Unseasonable rain and humid weather during warm periods may increase the rate of development of larvae. Heavy parasitic infestation will then occur and there will be need for additional treatment.

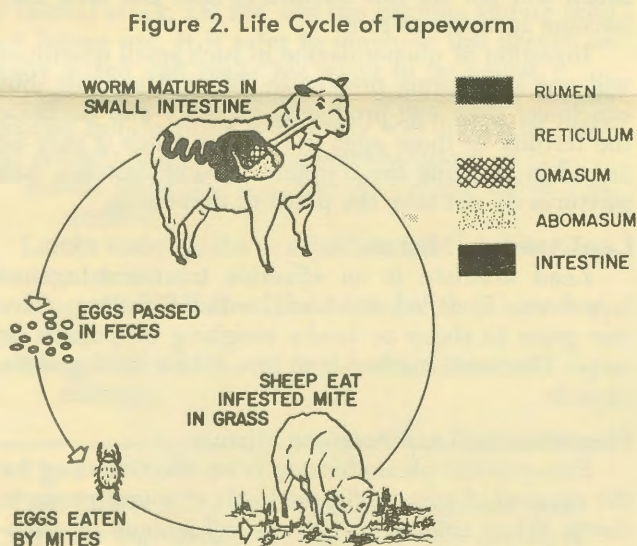
Control of parasitism in sheep is dependent upon good management and cannot be accomplished simply with indiscriminate use of drugs. Proper use of water,

feed and pastures can effectively reduce parasitic problems:

1. Prevent overstocking for long periods of time. Overstocking increases contamination rate and ingestion of infective larvae.
2. Use clean, rested pastures for lambs. Lambs are more susceptible to parasites than older sheep.
3. Put sheep on clean pastures following drenching. Do not go back to the same contaminated pasture.
4. Do not feed supplement or roughages on the ground; use feed bunks.
5. Proper nutrition is essential to control parasitism. Poorly fed sheep are more susceptible to parasitic disease than sheep in good condition.
6. Herded range bands should be moved to new areas daily and the same bed ground should not be used for long periods of time.
7. Use a diagnostic laboratory to learn what internal parasites are present, and select one of the best drugs to eliminate known parasites.

Feeder Lamb Drenching Recommendations

1. Treat all lambs immediately upon purchase (copper sulfate drench desirable for one of the drenches).
2. Treat all lambs a second time, in one month (use mineralized phenothiazine for one drench if Cu-Nic drench is not used).



A Drenching Program

Extra drenching will be needed as rainfall and management change.

For Lambing Program Where Ewes and Lambs Are Pastured

Name of Drench	Month	Flock	Treatment
Pre-pasture	Early May or or 2 weeks before sheep go to pasture	Entire Flock	Loxon, Tramisol or Phenothiazine
Pre-summer	End of June	Entire Flock	Tramisol, Loxon or Super-fine Phenothiazine
Weaning Time	July 15-31	Entire Flock and Lambs	Tramisol and Phenothiazine-Arsenate
Weaned Lambs*	August 15-31	Lambs	Super-fine Phenothiazine or Loxon
Breeding Time	October 20	Entire Breeding Flock	Loxon, Tramisol or Super-fine Phenothiazine
Before Lambing	December 15	Entire Breeding Flock	Thiabendazole**, Tramisol or Loxon

*Drench weaned lambs once per month when running on permanent pastures where breeding flock has grazed.

**Results of 1970 field works shows that it may require 1½ to 2 times the recommended dose of Thiabendazole to be effective.

For Early Lambing Program

A timely Drenching Program when ewes are pastured and lambs are early weaned and creep fed in drylot.

Name of Drench	Month	Flock	Treatment
Weaning Time	By June 1	Brood ewes, rams and ewe lambs	Tramisol or Super-fine Phenothiazine or Loxon
Breeding Time	3 weeks before breeding	Entire Breeding Flock	Loxon or Super-fine Phenothiazine or Thiabendazole
Before Lambing	November	Entire Breeding Flock	Loxon or Super-fine Phenothiazine or Thiabendazole

Recommended Sheep Internal Parasite Prevention and Control Program

Recommended Compounds for Control of Internal Parasites in Sheep and Lambs

	Drench	Remarks
1. Most stomach and intestinal round-worms	Phenothiazine	Control is much improved with the use of the fine particle size. Safe, effective.
	Haloxon (Loxon)	
	Tetramizole (Tramisol)	Now cleared for use in sheep. Safe, effective.
	Thiabendazole	Safe, effective.
	Rulene (Rulax)	Approved but withdrawn from the market by manufacturer.

2. Broad tape worm	Lead arsenate	May be mixed with Phenothiazine or Thiabendazole for control of roundworms and tapeworms with one drench.
	Dipenthan 70 (teniatol, teniazine)	
3. Fringed tape worm	No approved control	
4. Liver fluke	Carbon Tetrachloride	Toxic — use only at recommended doses. Effective only against adult fluke.
	Hexachloroethane	
	Hexachlorophene	
5. Coccidia	Sulfonamides	Fed at low levels continuously or high levels for several days.
	Amprolium	(Merck) Administered 2 to 3 days in drinking water or oral use. (Purchase through local veterinarian.)
	Furacin compounds	Used as a drench.
	Dipenthan 70	
6. Lung-worm	L. tetramasole (Tramisol)	Effective against both the adult and immature lung-worm.

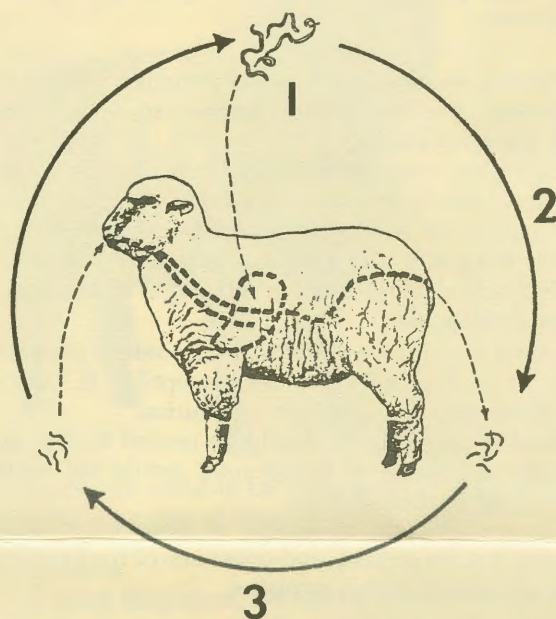


Fig. 4. Life cycle of lungworms. 1) Larvae penetrate intestine, migrate to and develop in the mesenteric lymph glands, and then migrate to lungs via bloodstream. 2) Eggs laid in bronchi, coughed up, swallowed, and hatch in host's digestive tract. 3) Larvae develop to infective stage. This parasite also occurs in goats.

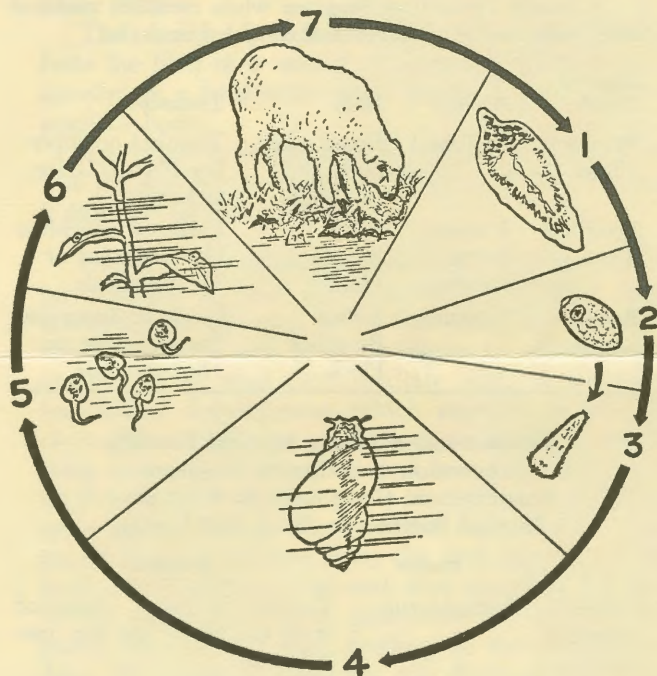


Fig. 3. Life cycle of a liver fluke. 1) Adult fluke. 2) Egg. 3) Embryo. 4) Development in snail. 5) Larvae. 6) Cysts. 7) Maturity in sheep's body. Eggs, embryos, larvae, and cysts seldom are seen without magnification.

Phenothiazine-Salt Mixture

Choose one of these salt mixtures: 1) 60 lbs. trace mineralized salt, 30 lbs. dicalcium phosphate and 10 lbs. phenothiazine; or 2) 9 to 14 lbs. trace mineralized salt and 1 lb. phenothiazine.

In addition to dosing at the times recommended, a salt mixture containing one pound of phenothiazine powder mixed with 9 to 14 pounds of salt may be fed "free choice" to the flock while at pasture. Frequently sheep will not eat this mixture at first, but later may become accustomed to it.

Ingestion of phenothiazine in such small quantities will not kill worms present in infected animals, but can lower their egg-producing capacity and decrease the fertility of those eggs passed out. Thus it may be an aid in lowering the contamination of pastures. **Salt mixtures do not take the place of drenching.**

Lead-Arsenate Mixture

Lead arsenate is an effective treatment against tapeworm. It is administered without fasting. Give one gram to sheep or lambs weighing 60 pounds or more. The usual method is to give it in a hard, gelatin capsule.

Phenothiazine-Lead Arsenate Mixture

Fine-particle phenothiazine is an effective drug for the removal of many different kinds of roundworms in sheep. When combined with a small amount of arsenate of lead it is particularly valuable in the control of most roundworms and the common tapeworms of sheep as well.

Use 64 grams of lead arsenate with a small amount of water. Mix thoroughly with one gallon phenothiazine drench.

For lambs under 50 lbs. use one ounce. Sheep over that weight need two ounces. For extremely large sheep use three ounces. Administer without fasting.

Phenothiazine

1. Handle sheep gently and carefully.
2. Do not starve sheep before treatment.
3. If treatment is given before turning the flock out to clean pasture, hold the flock at least 24 hours in order to give the drug a chance to act on the worms. After 24 hours there is little danger of contaminating pastures.
4. Do not treat within a month before lambing and 10 days after lambing.
5. Phenothiazine is safe and effective if used properly.
6. Stir all phenothiazine drenches thoroughly just before using. Phenothiazine is effective against common stomach worms. With arsenate it can be used for the common tapeworm.

Before using any new worm remedy, treat two or three animals to be sure that no unexpected results occur. Read and follow strictly all directions and precautions on the manufacturer's label. Use your judgment in modifying doses for weak animals.

Copper Sulfate-Nicotine Sulfate Drench (Cu-Nic)

Preliminary starvation for 12 to 18 hours before dosing is often practiced; otherwise take the same precautions as those for phenothiazine. Lambs should be at least two months old before receiving their first treatment. Preparation of the drenching solution:

- 1 oz. Copper Sulfate (blue-stone)
- 1 fluid oz. 40% Nicotine Sulfate
- 3 qts. soft (rain) or distilled water

The Cu-Nic drench is effective against common stomach worms and common tapeworms.

Dissolve the copper sulfate in a glass, earthenware or enamel crock. Do not add the nicotine sulfate until just before use. It is safer to purchase this drench already mixed and ready for water to be added.

One eight-ounce bottle of concentrated copper nicotine sulfate mixed with water will drench 64 (100-120 pound) sheep. Recommended dosage:

- Lambs 40-60 lbs. — 1 fluid oz. (of the above 3 qt. mixture)
- Lambs under 40 lbs. — ½ fluid oz. (of the above 3 qt. mixture)
- Sheep 80-100 lbs. — 2 fluid ozs. (of the above 3 qt. mixture)
- Sheep 100-120 lbs. — 3 fluid ozs. (of the above 3 qt. mixture)

CAUTION: Have your druggist weigh and measure the ingredients — this is a deadly poison if directions are not followed.

Deaths will result if the recommended dosages are exceeded. Cu-Nic drench is satisfactory for common intestinal tapeworms. Measure dosages accurately. Test syringes by discharging them into a bottle graduated in ounces. In case of overdose of drench, immediately give ½ to 1 pint of raw linseed oil.

Thiabendazole

Thiabendazole usually comes as a water dispersible powder in a plastic bottle. Series of research and field tests conducted in several states indicate that thiabendazole is an anthelmintic for sheep and lambs which possesses 1) high degree of effectiveness, 2) broad anthelmintic spectrum, and 3) wide margin of safety.

Thiabendazole has been particularly effective against roundworms and at least 12 species of the following: *Trichostrongylus*, *Haemonchus*, *Ostertagia*, *Nematodirus*, *Chabertia*, and *Oesophagostomum*.

Thiabendazole is not recommended for the common tapeworm (*Moniezia*).

Loxon (Haloxon)

Haloxon chemically is an almost tasteless, odorless, white powder. This powder can be formulated into tablets, capsules, pastes, suspensions, or pellets for feed additive purpose.

This compound is very safe and is effective against many of the roundworm (nematode) parasites of sheep. It is particularly active against *Haemonchus contortus*, the common stomach worm of sheep. It is effective against many of the immature forms as well as the mature adult parasites. However, it is not highly effective against nodular worm, nor does this compound have proven effectiveness against lungworms, tapeworms or coccidia.



Preparation of Loxon as a Drench

In water 32 fluid ozs. (1 qt)

Loxon Required	Amount Prepared
1 packet	33 fl. ozs.

Sheep and Lambs	Dose of Liquid
up to 50 lbs.	$\frac{1}{2}$ fl. oz.
50 to 90 lbs.	1 fl. oz.
90 to 150 lbs.	$1\frac{1}{2}$ fl. oz.
over 150 lbs.	2 fl. oz.

Heavily infested lambs should be retreated in 3 weeks. Unused drench suspension may be stored in a labeled container for up to 4 weeks.

Tramisol (Tetramizole)

Approval of Tramisol Levamisal by FDA for sheep has been granted. Tramisol Levamisal Hydrochloride is a broad spectrum anthelmintic and is effective against the following in sheep and lambs.

Stomach worms —

Haemonchus (large stomach)
Trichostrongylus (small)
Ostertagia (medium or brown)

Intestinal worms —

Trichostrongylus (whip)
Cooperia (small)
Nematodirus (thread)
Ostertagia (brown or medium)

Lungworms—

Dictyocaulus (large)

Dosage and administration levels for sheep and lambs, as now prepared, are expected to read:

Weight	Drench Dose	Packet will Treat
50 lbs.	$\frac{1}{2}$ fl. oz.	256 head
($\frac{1}{2}$ fluid ounce mixed according to instruction provides 0.184 grams of the levamisole hydrochloride activity anthelmintic which is the same as one oblet which is given per 50 lb. body weight).		

100 lbs.	1 fl. oz.	128 head
150 lbs.	$1\frac{1}{2}$ fl. oz.	96 head
200 lbs.	2 fl. ozs.	64 head

Contents of one packet is placed in a container and one gallon of water (128 fl. ozs.) is poured into the container. Swirl briefly to dissolve. The one gallon of solution is then administered as a single drench dose according to the table. Prepare solutions as needed. Solutions can be stored for several days in clean, closed containers. Product is now available in 13 gram packets of drench powder.

Tramisol is available as sheep wormer oblets. Each oblet contains 0.184 grams of Levamisole hydrochloride activity anthelmintic. One oblet should be given per 50 lbs. of body weight. Lambs and sheep may be retreated within 2 to 4 weeks after first treatment. Tramisol is not administered within 72 hours of slaughter.

Drenching Procedure

1. Use a bottle or dosing syringe.
2. Keep the sheep off feed for 12 to 18 hours before drenching and 4 hours after drenching when copper sulfate-nicotine sulfate is used.
3. Be sure that sheep is standing on all four feet.
4. Do not raise the sheep's nose higher than his eyes.
5. Take your time — don't choke the sheep.
6. Late lambs, thin lambs not sold at weaning time: shear, drench, feed grain until fat.

Lambs on clean pasture, nursing their mothers, gaining $\frac{3}{4}$ pound or more daily, and sold in May or June ordinarily do not need drenching.

Do not shear, dip and treat sheep all at the same time. Each of the above procedures causes an extra stress on breeding ewes or lambs. Sheep or lambs may be "knocked-down" and die when shearing, dipping and drenching are done simultaneously. Use good judgment at any time you are drenching sheep or lambs.

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